

REMARKS

Claims 17-30 and 32-43 are pending in the application.

The Office rejected claims 17-30 and 32-43 under 35 U.S.C. 103(a) as being unpatentable over Howard 4,884,071.

Pending independent claims 17 and 32 have been amended now to add the limitation that the transmission devices are mounted in a reference plane in each end of the downhole component.

Applicants agree with the Office that Howard '071 does not teach that the distances between pairs of devices are substantially constant. The Hall effect devices disclosed in Howard '071 solved one particular problem present in the drill strings made prior to the present invention. Hall effect devices are devices which transfer data in only one direction, and rely on magnetic fields acting over a distance. It would appear that Howard '071 used these devices because they can transfer data without being particularly sensitive to the normal variations in spacing between the coupled devices present in the drill strings prior to the present invention. These variations are due to the tolerance stack involved in all the machining operations required to manufacture the attachments for downhole components of drill strings. Although the tolerance of each operation is routinely controlled extremely closely, the cumulative stack of all these operations may be enough to affect the operation and tuning of coupled inductive coils used for 'two way' data communications. Therefore, although the device of Howard '071 is limited to 'one way' data communication, he appears to have solved the tuning problems presented by the spacing variations of prior art drill strings used with tuned inductive devices for 'two way' data communication systems.

In the downhole drilling industry, it is very desirable to provide 'two way' data communications using tuned inductive coils as communications devices. The present invention provides an improved drill string with a reference plane formed in each end of the downhole components. These reference planes are formed in the downhole components in a manner which controls the spacing between each and every set of coupled inductive coils, as shown and described in the present application. Since the inductive coils are mounted in these precisely spaced reference planes, they are able to provide two-way data communication in an efficient manner.

In order to clearly and distinctly point out these important structural and functional differences, independent claims 17 and 32 have been amended now to state that the transmission device is mounted in a reference plane in each end of the downhole component.

Applicants believe that claims 17 and 32 as amended are now allowable and therefore respectfully request allowance of these claims.

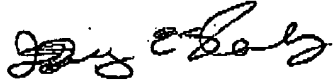
Pending dependent claims 18-30 and 33-43 depend from allowable base claims. Applicants believe these claims are now also allowable and respectfully request allowance of these claims as well.

Applicants believe that this amendment now puts this application in condition for allowance. Applicants therefore respectfully request that this amendment be entered and a timely Notice of Allowance be issued in this case.

It is believed that there are no fees due at this time. However, the Commissioner is hereby authorized to charge any fees which may be required at any time during the prosecution of this application without specific authorization, or credit any overpayment to Deposit Account

180584. If there are any questions concerning the above, please contact the undersigned at 281-878-5658.

Respectfully submitted,



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